



Computing Programme of Study 2020

Purpose of Study

Our school curriculum will ensure;

That children leave our school with the essential life skills needed to be able to participate more readily in an ever changing digital world. As technology is such an important part of our lives today, used in nearly everything we do, it has never been more important for our children to understand the origins of technology. Therefore, as part of our curriculum, children will be taught about how technology has changed over time to give them a broader knowledge of how it has evolved and continues to evolve year upon year. We also wish to explain to our children the importance of staying safe online. In our world today, children are going online at an increasingly young age and although this presents many opportunities for developing life skills, it also presents risks. Children will be taught how to conduct themselves online so that they can be responsible, competent, confident users of information and communication technology. As well as the threads that we wish to intertwine through our curriculum, we also want our children to explore the key areas of information and communication technology: studying computer science, digital literacy, information technology and e-safety. Our children will build upon their knowledge and skills in each of our areas of computing year upon year. We aim to deliver a relevant, challenging and enjoyable computing curriculum for all pupils so that they can leave us with the necessary skills with which to progress onto secondary school and later into their future careers.

The national curriculum states that;

A high-quality computing education equips pupils to use **computational** thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights to both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and **computation**, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims

Our school curriculum for computing aims to ensure for all pupils;



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- That starting from Year 1 children will explore and be made aware of how technology has evolved over time, they will build up this knowledge learning about a different piece of technology each year from Year 1 up to Year 6
- That children are taught on a progressive scale how to use technology safely and effectively for many different purposes
- That children are taught how to stay safe online and are made aware of the possible dangers. Children will also take part in E-Safety week and Safer Internet Day every year
- That children are taught the correct vocabulary for the area of information communications technology they are currently learning and working within their year group to deepen their understanding further

The national curriculum for computing aims to ensure that all pupils:

- Can understand and apply the fundamental principles and concepts of computer science, including **abstraction, logic, algorithms** and data representation
- Can analyse problems in **computational** terms, and have repeated practical experience of writing computer programs in order to solve such problems
- Can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- Are responsible, competent, confident and creative users of information and communication technology

Glossary

Abstraction – Getting the computer to focus on the essentials, working out which details are important. If you do not get it right the algorithms will not work properly. Identifying what is important.

Algorithms – A set of instructions for the computer to follow. They are at the heart of all computer programs.

Computation – The use of computers, especially as a subject or research of study.

Computational – Using or relating to computers.

Debug – The process of finding and resolving defects or problems with a computer program that prevent correct operation of computer software or system.

Input – Is data that a computer receives.

Logic – Computer logic is an aspect of computer design concerning the fundamental operations and structures upon which all computer systems are built.

Output – Is data that a computer sends.

URL – The address of a world wide webpage.

Voice over internet – Making phone calls through the use of internet rather than through a regular landline or a mobile network (e.g. Skype, Apple FaceTime, Google Talk).



Programme of Study - Key Stage 1 and 2

KS1

Our school curriculum for computing will ensure pupils are taught to:

- Understand what an **algorithm** is, how these are implemented as programs and to create **algorithms** to solve simple problems
- Read and produce a sequence of instructions that result in a simple outcome
- Produce a sequence of commands that result in a planned effect
- Program, test and **debug** simple programs
- Discuss how television and telephones have evolved over time



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- Use the internet and other applications with purpose
- Understand the importance of staying safe online, keeping information private and how to report concerns on the internet

The National Curriculum for computing states pupils should be taught to:

- Understand what **algorithms** are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- Create and **debug** simple programs
- Use logical reasoning to predict the behaviour of simple programs
- Use technology purposefully to create, organise, store, manipulate and retrieve digital content
- Recognise common uses of information technology beyond school
- Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies

Computer Science

Year 1

Children will be taught to:

- Understand what an **algorithm** is and that in order for the computer to function correctly these instructions need to be precise
- Read a set of instructions and usually predict the outcome
- Produce a set of commands for another to follow
- Discuss how television has changed over time, looking into its function, purposes and its inventor

Year 2

Children will be taught to:

- Understand how **algorithms** are implemented as programs
- Create **algorithms** to solve simple problems and work out what is wrong with an **algorithm** when the steps are out of order
- Produce a sequence of instructions that result in simple outcomes
- Produce a sequence of commands that result in a planned effect
- Program Bee-Bots to follow a created algorithm
- **Debug** simple programs by correcting mistakes when things move away from the desired outcome



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	<ul style="list-style-type: none"> - Discuss how the telephone has changed over time, looking into its function, purpose and its inventor
Digital Literacy	
<p>Year 1 Children will be taught to:</p> <ul style="list-style-type: none"> - Use a website to find answers to simple questions with help - Navigate a website using buttons and image links - Use drawing and text tools to impart information using the paint application and Microsoft Word 	<p>Year 2 Children will be taught to:</p> <ul style="list-style-type: none"> - Enter a URL for a website with some support - Using a website to find information to answer questions with help - Navigate around a website with purpose and discuss how they found specific information on a website - Begin to use a range of applications on computers and other devices independently - Recognise where and how technology is used beyond school
Information Technology	
<p>Year 1 Children will be taught to:</p> <ul style="list-style-type: none"> - Log onto a computer with assistance - Enter simple sentences using a keyboard - Use a mouse to point, click and drag objects around a screen - Save and print work with assistance - Discuss how they have created work using the computer 	<p>Year2 Children will be taught to:</p> <ul style="list-style-type: none"> - Log onto a computer independently - Enter sentences using keyboard or touch typing - Use a mouse or touch input to make selections and move objects - Save, print and retrieve work independently
E-Safety	



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<p>Year 1 Children will be taught to:</p> <ul style="list-style-type: none"> - Understand that some information is personal (e.g. name, address, hobbies) - Know that personal information should only be given to trusted people - Can identify characteristics of trustworthy/untrustworthy people and justify their reasons 	<p>Year 2 Children will be taught to:</p> <ul style="list-style-type: none"> - Understand the importance of staying safe online - Understand a wider range of personal information that should not be shared (attendance at a specific place) - Identify some ways to use computers safely - Identify some ways of reporting inappropriate content and contact online
Key Vocabulary	
<p>Year 1 computer, algorithms, instructions, predict, outcome, website, log on, keyboard, mouse, technology, point, click, drag, type, print, save, personal information, e-safety, buttons, internet, text.</p>	<p>Year 2 computer, algorithms, programs, instructions, predict, outcome, website, log on, keyboard, mouse, sequence, command, debug, URL, web, technology, point, click, drag, type, print, save, retrieve, personal information, e-safety, buttons, internet, reporting, search engine, tools, text, devices.</p>
Spiritual and Emotional Engagement	
<i>With the rest of the school KS1 will take part in e-Safety Week and Safer Internet Day to further their understanding of how to stay safe online.</i>	
<p>During year 1 as part of the children's exploration of television they will take part in World Television Day. This is celebrated on Saturday 21st November 2020 but in school it shall be celebrated on Friday 20th November. It is advised that the children have already explored different versions of the television throughout the years prior to this day so that they can work together with their parents and teachers to create</p>	<p>During year 2 children will have the experience of visiting a local Apple Store at the beginning of their computer science topic. This is to gain an initial understanding of coding. Activities range from coding basics to programming robots. This is a great interactive experience that will hook the children and get them emotionally engaged about their new topic.</p>



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their own model TV. This is a great chance to invite parents into school and to get the children excited and engaged about their topic.

KS2

Our school curriculum for computing will ensure pupils are taught to:

- Research and explore how technologies have changed over time studying purposes, functions and inventors
- Use real life situations to help bring **algorithms** to life and to bring sequence, selection and repetition into these **algorithms** as well as into programs also using conditional statements to explore their understanding
- Write, test and amend computer programs evaluating their work as they go
- Use the internet with purpose to obtain data including checking its reliability; exploring what other uses the internet has to offer; making use of the features web browsers have and the opportunities the internet offers for communication and collaboration
- Use applications such as Word and presentational software to develop their knowledge of the tools and features that can be used both within the application and features they can use from the internet to help them gather content to match their work to their audience
- Create digital content incorporating text, images and sound that resonates with their desired audience and checking other digital content for its suitability for the audience
- Be able to communicate safely and effectively online, to identify ways which they can stay safe and the means in which to report concerns about content and contact
- Understand why personal information needs to be kept private, the need to use and keep safe passwords and know to only give information to trusted sources



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The National Curriculum for computing states pupils should be taught to:

- Design, write and **debug** programs that accomplish specific goals, including controlling or stimulating physical systems; solve problems by decomposing them into smaller parts
- Use sequence, selection, and repetition in programs; work with variables and various forms of **input** and **output**
- Use logical reasoning to explain how some simple **algorithms** work and to detect and correct errors in **algorithms** and programs
- Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour, identify a range of ways to report concerns about content and contact

Computer Science

Year 3	Year 4	Year 5	Year 6
<p>Children will be taught to:</p> <ul style="list-style-type: none"> - Turn a real life situation into a set of instructions by deconstructing it into manageable parts - Give a sequence of instructions, some of which are repeated (repetition) and some which are selected (selection) e.g. if...then, to make things happen - Program a sequence of commands that result in a planned effect 	<p>Children will be taught to:</p> <ul style="list-style-type: none"> - Understand why it is important to turn real life situations into algorithms and to bring into these algorithms sequence, selection and repetition - Use sequence, selection and repetition in computer programs - Notice if repetition is involved within a program and predict the outcome of a given algorithm 	<p>Children will be taught to:</p> <ul style="list-style-type: none"> - Know that computer programs contain commands that achieve specific actions - Write and amend computer programs - Program a number of algorithms that achieve a specific outcome - Use repetition, variables and conditional statements in computer programs - test computer programs and correct any errors 	<p>Children will be taught to:</p> <ul style="list-style-type: none"> - Write and amend more complex programs to create a variety of outcomes - Use iteration (repeats and loops), variables and conditional statements (if...then) in computer programs - Test computer programs and correct most errors - Research and explore how the computer has changed over time. Maybe discuss how computers helped with the



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<ul style="list-style-type: none"> - Program and test a simple program and to identify an error within their program that prevents the desired algorithm and then rectify it - Evaluate their own work and suggest improvements - Research and explore how the gaming console has changed over time (etc. inventor and different purposes and functions) 	<ul style="list-style-type: none"> - Understand the difference between the internet services (World Wide Web) and the internet - Be able to identify a number of computing devices both within school and outside of school - Be able to identify some forms of input and output - Understand that computers store data as numbers - Research and explore how music has changed over time. (etc. Radio, iPods and mp3s also looking into the inventors and different purposes and functions over time) 	<ul style="list-style-type: none"> - Research and explore how the camera has changed over time. Compare what it was like when it first got invented to what it is like now (etc. inventor and different purposes and functions over time) 	<p>pandemic in 2020 Covid-19. How did people communicate with each other during lockdown?</p>
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Digital Literacy

<p>Year 3 Children will be taught to:</p> <ul style="list-style-type: none"> - Navigate a website finding information by using hyperlinks and the back button - Carry out simple searches using a search engine to retrieve desired digital content 	<p>Year 4 Children will be taught to:</p> <ul style="list-style-type: none"> - Understand that a computer network means connected computers - Understand that a computer network consists of a number of computers and devices that are connected - Carry out searches using a search engine involving more 	<p>Year 5 Children will be taught to:</p> <ul style="list-style-type: none"> - Know that internet search engines use algorithms to find web content (e.g. web crawling) - Suggest what other activities you can use the internet for other than web browsing (e.g. online gaming, voice over internet, email etc.) 	<p>Year 6 Children will be taught to:</p> <ul style="list-style-type: none"> - Use search technology and clear search terms to view web pages and obtain data - Create digital content for specific purposes and audiences - Communicate and collaborate using technology and online services
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<ul style="list-style-type: none"> - Question credibility of online information - Know how to add a website to favourites and then use the favourites tab to access those websites - Print webpages and be able to copy and paste information into other applications - Discuss and describe how they use IT at school and at home - Evaluate and suggest improvements for their own work and others - Confidently type web addresses into a web browser 	<p>than one condition to retrieve a variety of desired digital content sometimes with help</p> <ul style="list-style-type: none"> - Know that not all information from the internet is reliable and needs to be checked - Discuss that you can use the internet for other activities other than web browsing - Confidently and independently enter URLs into the address bar of a web browser 	<ul style="list-style-type: none"> - Check reliability by cross checking information provided on one website against that provided on another - Create digital content for specific purposes - Discuss opportunities for communication and collaboration online - Improve their work based on feedback and can comment on the success of their work 	<ul style="list-style-type: none"> - Use feedback to improve digital content - Use a wider range of internet services such as voice over internet to communicate
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Information Technology

<p>Year 3 Children will be taught to:</p> <ul style="list-style-type: none"> - Combine graphics with text and know how to manipulate them - Use applications such as word or presentation software to use appropriate effects and to resize graphics (including bold, italics, underline) - Align text (left, right and centre) using some applications such as word 	<p>Year 4 Children will be taught to:</p> <ul style="list-style-type: none"> - Use applications such as word or presentation software to progress their knowledge of the tools and features available to help them match their work to their audience - Use an internet service such as an emailing service to send and reply to an email 	<p>Year 5 Children will be taught to:</p> <ul style="list-style-type: none"> - Understand that information in the form of text, sound and pictures can be combined to create digital content and communicate with an audience - Create simple digital content (e.g. a webpage) incorporating text and graphics 	<p>Year 6 Children will be taught to:</p> <ul style="list-style-type: none"> - Plan, design and create digital content that incorporates text, images and sound and communicates with an audience - Be able to discuss the rationale behind their designs - Develop and refine detail content - Critically analyse digital content and makes
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<ul style="list-style-type: none"> - Copy text and images from an internet page - Be able to use the undo and redo buttons in documents 		<ul style="list-style-type: none"> - Recognise and discuss the audience when designing and creating digital content - Use an emailing service to send, reply and to attach content to an email 	<p>judgements about its suitability for a specific audience</p>
E-Safety			
<p>Year 3 Children will be taught to:</p> <ul style="list-style-type: none"> - Identify ways in which they can stay safe while using ICT - Understand the need of passwords to protect information and that they should be kept safe - Use ICT to communicate, identifying and discussing the risks and then act to minimise them - Follow e-Safety guidelines - Recognise acceptable/unacceptable behaviour when using technology and being online 	<p>Year 4 Children will be taught to:</p> <ul style="list-style-type: none"> - Identify several ways they can keep safe when using ICT - Know the need to use secure passwords and keep them private - Know that not all information from the internet is reliable and needs to be checked - Use appropriate search criteria to find relevant information and check its plausibility and usefulness - Use ICT to communicate and collaborate, identify some of the risks and act to minimise them 	<p>Year 5 Children will be taught to:</p> <ul style="list-style-type: none"> - Identify a range of ways they can keep safe when using technology online and know how to report any concerns - Know that personal information should only be given to trusted sources - Know that some information on the internet may be misleading or inaccurate and that it needs to be checked - Use technology and online services to communicate and collaborate, identify some of the risks and act to minimise them 	<p>Year 6 Children will be taught to:</p> <ul style="list-style-type: none"> - Communicate effectively and safely online - Use digital tools to communicate and collaborate effectively online - Find information online and check it for accuracy and reliability - Identify some of the risks associated with work and leisure in a digital society and act to minimise them



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Key Vocabulary – Children will continue to use the KS1 vocabulary in addition to...			
<p>Year 3 Undo, redo, graphics, presentation software, copy, paste, hyperlinks, repetition, selection, test, favourites, guidelines, password, align, error, evaluate, bold, italics, underline, credibility.</p>	<p>Year 4 Undo, redo, graphics, presentation software, copy, paste, hyperlinks, repetition, selection, test, favourites, guidelines, password, align, error, evaluate, bold, italics, underline, email, send, reply, input, output, digital content, network.</p>	<p>Year 5 Undo, redo, graphics, presentation software, copy, paste, hyperlinks, repetition, selection, test, favourites, guidelines, password, align, error, evaluate, bold, italics, underline, email, send, reply, input, output, digital content, network, trusted sources, variables, conditional statements, purpose.</p>	<p>Year 6 Undo, redo, graphics, presentation software, copy, paste, hyperlinks, repetition, selection, test, favourites, guidelines, password, align, error, evaluate, bold, italics, underline, email, send, reply, input, output, digital content, network, trusted sources, variables, conditional statements, purpose, iteration, analyse.</p>
Spiritual and Emotional Engagement			
<p><i>Each year, KS2 will take part in the STEM summer fair. This is where children will get the chance to create their own projects and will be given the opportunity to showcase these projects in school to give them pride in their achievements. As well as this the whole school will take part in e-Safety Week and Safer Internet Day to further their understanding of how to stay safe online.</i></p>			
<p>During year 3 as part of their computer science topic they will explore the first ever gaming consoles and how they developed over time looking at the different models and their differences. At the end of this topic once the children have gained an understanding of the different gaming consoles and their features they will have the</p>	<p>During year 4 as part of their studies into the radio the children will take part in World Radio Day on the 13th February. Radio stations all around the world put on special shows or segments to celebrate the radio and the powerful meaning that it holds for many people.</p>	<p>During year 5 as part of their information technology topic the children will get introduced to creating digit content (e.g. a website). The children will work with a web designer initially to spark their interest and show them the possibilities of what can be created.</p>	<p>During year 6 the children will take ownership of organising the Computing and Science Fair. It will be their job to choose the theme of the current year’s fair, help to plan activities and judge the contests.</p>



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<p>experience of visiting the National Videogame Museum in Sheffield as all gaming is reliant on coding. This will progress from what they learnt in year 2 on coding and also from the start of this topic in year 3.</p>			
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